

## **BREAST CANCER RESEARCH UNDERGRADUATE SUMMER TRAINING PROGRAM**

**Thomas T. Andersen, Ph.D., and Jean M. Cornwell**

Graduate Studies Program, Albany Medical College

anderst@mail.amc.edu

In order to eradicate breast cancer, it will be necessary to have a cadre of talented investigators whose careers are dedicated to studies of the prevention, treatment, and early detection of the disease. The workplace of the future will be such that attracting the brightest and best minds will, in itself, be a challenge. By investing in young people before they have made their career choices, and specifically by providing them with first-hand experience in a modern breast cancer research laboratory, we anticipate that many of these talented young people will discover an interest in research that they did not know they had, and will discover new career options that will position them to join the fight against breast cancer. Students who experience the excitement of discovery, who face and conquer the challenges of research, and who are rewarded by contributing their best work to the greater scientific community, very often choose to make a career in the scientific or clinical arenas. It is this investment that will pay multiple dividends in the years ahead. Failure to provide this investment may lead many of these bright young students to choose alternate careers or paths from which we may never be able to attract them, thus leaving a personnel void in the war on breast cancer.

The vision of the Undergraduate Summer Training Program in Breast Cancer Research (BCR) at the Albany Medical College is to recruit highly talented undergraduates to careers (either Ph.D. or M.D.) in breast cancer research so that they can make meaningful contributions to the eradication of this disease. It is a long-term goal of the program to have a very high percentage of program alumni(ae) find careers involving BCR. Short-term goals of the program are to see significant numbers of these students matriculate in graduate schools and medical schools and, while in professional school, to contribute their expertise directly to BCR. Additionally, it is a goal to see some of these students matriculate at the Albany Medical College (graduate or medical school).

Data from the first two summer programs will be presented. That talented students are being recruited is evident from the diversity of undergraduate schools (students from 70 different colleges applied), the quality of the matriculants (average undergraduate GPA 3.85), and the number of applications (80 applications for 5 positions per year). Students spend 90% of their time in a laboratory of a funded cancer investigator doing authentic, meaningful, mentored research, and present their results in an end-of-summer Research Day format. Students also participate in a number of Enrichment Activities including an Overview of Breast Cancer series, Meet the Investigator luncheon sessions, sessions to meet breast cancer survivors, career opportunities sessions, and reading and discussing literature about breast cancer research. All aspects of the program are tracked and evaluated.

## **RESEARCH TRAINING IN BIOPSYCHOSOCIAL BREAST CANCER RESEARCH**

**Michael A. Andrykowski, Ph.D.**

University of Kentucky College of Medicine

mandry@pop.uky.edu

Psychosocial and behavioral variables are recognized as key factors in understanding the cause, detection, treatment, and course of recovery from cancer. The purpose of this project is to provide training in the application of behavioral science theory and research methods to the development of biopsychosocial research addressing significant issues in breast cancer (BC). Research training for 2 predoctoral and 1 postdoctoral trainee is supported by the grant each year. Each predoctoral and postdoctoral trainee spends from 1-3 years in the training program with length of participation based upon individual needs and interests and prior preparation. Research trainees are drawn from any behavioral or social science discipline. Research training is provided by a faculty representing a variety of disciplines including psychology, behavioral pharmacology, anthropology, nursing, and hematology/oncology. Specific research training activities include graduate coursework, participation in regular meetings of training faculty and trainees, individual tutorials with training faculty, and participation in BC-related research under the supervision of training faculty. Trainees participate in “communal” research projects as well as one or more projects tailored to the unique interests of the individual trainee (e.g., doctoral dissertation). Trainees participate in all phases of the research enterprise, including development of the research design, literature review, obtaining approval for use of human subjects, data collection, data entry and analysis, and manuscript preparation. Trainees supported by the training program have contributed to 6 published manuscripts with several more manuscripts under preparation or review. Trainees have also served as primary author on over 20 poster or platform presentations of BC-related research. We conclude that the training program is effective in attracting new and highly qualified young investigators to biopsychosocial BC-related research. It is also effective in providing them with the skills and experience which will enable them to succeed in this area. In turn, the creation of a cadre of young scientists experienced in BC research will contribute to efforts to reduce mortality and morbidity associated with BC.

## **POSTDOCTORAL TRAINING PROGRAM IN BIOBEHAVIORAL BREAST CANCER RESEARCH**

**Dana H. Bovbjerg, Ph.D., and William H. Redd, Ph.D.**

Biobehavioral Medicine Program, Cancer Prevention and  
Control, Ruttenberg Cancer Center, Mount Sinai School of  
Medicine, New York, NY 10029-6574

dana.bovbjerg@mssm.edu

Accumulating evidence indicates that the “biobehavioral model” of health and disease may have considerable relevance for cancer generally, and breast cancer in particular. Broadly stated, this model proposes that what people think and feel affects the state of their health in two basic ways: by affecting health-related behavioral choices and by affecting biological mechanisms that may affect risk of disease, response to treatment, and/or disease progression/resolution. The role of biobehavioral interactions in breast cancer has received increasing attention in recent years. Through their effects on behavioral choices, cognitive and emotional factors are now recognized to influence women’s risk of developing breast cancer, compliance with screening guidelines, interest and uptake in genetic testing, response to treatment, as well as contribute to quality of life among breast cancer survivors. Although psychosocial interventions have been reported to affect survival, the effects of cognitive and emotional effects on biological processes involved in breast cancer incidence, progression, or recurrence have yet to be well studied. Effects of cognitive and emotional factors on chemotherapy-related side effects are increasingly well documented, however.

Given the complexity of the interactions postulated by the biobehavioral model, to fully explore its implications for breast cancer it is important to increase the number of researchers with the broad-based training that allows them to conduct truly interdisciplinary research addressing issues that transcend traditional disciplinary boundaries. The Postdoctoral Training Program in Biobehavioral Breast Cancer Research is designed to provide Trainees with advanced degrees in relevant areas (e.g., epidemiology, medicine, psychology, public health) with the necessary intellectual background needed to “speak the language” of the multiple relevant disciplines and with the “hands-on” experience under the tutelage of experienced Mentors necessary to do interdisciplinary research and become independent investigators.

**Specific Aim 1.** To provide postgraduate Trainees a broad-based intellectual background needed to conduct interdisciplinary biobehavioral breast cancer research thorough structured didactic training (e.g., Core Curriculum Lecture Series, Advanced Seminars) and informal interactions with the Training Faculty and other active researchers.

**Specific Aim 2.** To teach Trainees interdisciplinary research skills through hands-on participation in ongoing federally-funded breast cancer research programs of the Training Faculty and by having Trainees develop and conduct their own related biobehavioral research projects with the guidance of their research Mentors.

**Specific Aim 3.** To foster the development of Trainees’ independent research careers in biobehavioral breast cancer research through both formal instruction and direct experience with writing research papers and grants, under the direct tutelage of their Mentors.

Now in its third year, the Postdoctoral Training Program in Biobehavioral Breast Cancer Research has begun to successfully address those aims, as part of an ongoing commitment to developing a cadre of researchers with expertise in this interdisciplinary field. Our experience with recruitment efforts, formal didactic training, informal training methods, and mentoring will be described and discussed. Exchange of ideas and experience with other institutions that provide training programs in the area should result in further improvements of the training efforts at the national level.

**DEVELOPMENT OF THE NEXT-GENERATION  
BREAST CANCER DIAGNOSIS IMAGING:  
A TRAINING PROGRAM AT  
HOWARD UNIVERSITY**

**Mohamed F. Chouikha, Ph.D.,<sup>1</sup> Shih-Chung B. Lo, Ph.D.,<sup>2</sup>  
Paul Wang, Ph.D.,<sup>3</sup> Ahmed Jendoubi, Ph.D.,<sup>1</sup>  
and Matthew T. Freedman, M.D.<sup>2</sup>**

<sup>1</sup>Department of Electrical Engineering, College of  
Engineering, Architecture, and Computer Sciences, Howard  
University, Washington, DC 20059; <sup>2</sup>Radiology  
Department, Georgetown University Medical Center,  
Washington, DC 20007; <sup>3</sup>Radiology Department, Howard  
University Medical Center, Washington, DC 20059

cm@scs.howard.edu

This program represents a collaboration between participants from Howard University in the Department of Electrical Engineering, the Department of Systems and Computer Sciences, the Department of Radiology and the Cancer Center; and collaborating investigators from Georgetown University Image Science and Information Systems (ISIS). This on-going training program consists of three components, namely: start up, training and research development stages. In the start up stage, the faculty members will be trained in breast cancer imaging and developing a unique database, primarily African-Americans, available to Howard University and to the investigators on breast cancer research and training community at large. They would also take internship at the Radiology Department to understand the breast cancer screening and diagnosis viewing and related procedure as well as to observe breast cancer patterns on mammograms, ultrasound, and MRI.

Georgetown University investigators and clinical members at Howard University Medical Center have begun to offer a series lectures including: Breast Anatomy, Physics and Instrumentation of Mammography, Breast Ultrasound, Breast MRI, State-of-the-Art Ultrasound Instrumentation, Cancer Biology and Physiology, Breast Cancer Oncology and Management, and A High-Performance Software Display Workstation for Breast Cancer Research.

Under this partnership arrangement, one Ph.D. student is working on separation of benign and malignant masses on mammograms. Two proceeding papers based on this collaboration have been accepted for publications. Four faculty members and five graduate students participate in the lecture series. Two undergraduate students also attend the lecture series and work with three faculty members collecting cases for the establishment of breast imaging library and network system at Howard University.

## **INSTITUTIONAL PH.D. TRAINING PROGRAM IN BREAST CANCER RESEARCH**

**Dean P. Edwards**

University of Colorado Health Sciences Center and  
University of Colorado Cancer Center

dean.edwards@uchsc.edu

The training program is designed to graduate well-qualified and highly motivated scientists who will make a career in the breast cancer research field and who will have a strong potential for contributing new research approaches to the breast cancer problem. The six students supported by the program have already entered into different Ph.D. degree-granting programs that each have their own guidelines, curriculums, and requirements. The curriculum of the Breast Cancer Training Program extends beyond that of the normal Ph.D. requirements and includes the following:

- 1) A seminar series is held weekly in conjunction with the hormone related malignancies program of the UC Cancer Center. Speakers are a mix of invited outside experts, internal faculty, and students who give annual presentations of their work.
- 2) Mini-symposium. Half-day event of four outside speakers on current topics in breast cancer research. This was organized jointly with the UC Cancer Center and held on March 15<sup>th</sup>, 2002.
- 3) Annual scientific retreat. This is a two-day (Feb 1-2, 2002) event off-campus, organized jointly with a Program Project Grant on “Developmental Biology of the Mammary Gland.” Students, faculty and outside invited scientists present posters or platform talks.
- 4) A monthly journal club is organized jointly with trainees (post and predoc) of the program project grant on Developmental Biology of the Mammary Gland.
- 5) A didactic course (2 credit hrs) on endocrinology and clinical aspects of breast cancer is taught by the faculty of the training grant.
- 6) Student travel and participation in scientific meetings. The training grant provides travel support for students to present their work at national/international meetings.

The faculty have established records of successful training of Ph.D. and M.D./Ph.D. students, and active well-funded breast cancer research projects with principal areas of research in apoptosis, cell cycle control, steroid hormone receptors, signal transduction, oncogenes, stem cells, DNA damage, and growth factors. This program is important for the future of breast cancer research. The goal is to train and stimulate the best and brightest young scientists to make career commitments to the breast cancer field.

# **DEVELOPING A TRAINING PROGRAM IN BREAST CANCER RESEARCH TO DECREASE THE DISPARITY OF MORBIDITY AND MORTALITY IN UNDERSERVED/MINORITY WOMEN**

**Dr. Sylvia A. Flack**

Winston-Salem State University

flacks@wssu.edu

**Background:** The proposal is entitled, “Developing a Training Program in Breast Cancer Research to Decrease the Disparity of Morbidity and Mortality in Underserved / Minority Women.” Winston-Salem State University (WSSU) is designated as a Historically Black College or University (HBCU) and has traditionally emphasized the teaching/learning process rather than the research process. As the communities in which HBCU’s are located experience insurmountable social, economic and health problems, it has become paramount that these institutions of higher learning assist in solving some of these problems. Research can help the institution focus on the critical community needs. It is indisputable that minority populations experience disparities as it relates to health issues and that minority elderly women experience disparities of breast cancer. This proposal is designed to develop a training program that will enable four trainees from the School of Health Sciences at WSSU to develop their research skills by engaging in breast cancer research through a mentoring process with researchers from Johns Hopkins University. These researchers are experts in research methodology and analysis, and in clinical breast cancer research. A committee of researchers, clinicians and educators led by Johns Hopkins School of Nursing (JHU), the collaborating institution, will guide the development and the research activities of these trainees through face-to-face meetings, interaction conducted through mail, E-mail, fax, distance learning, and site visits. Initial research concepts will be developed through pilot studies, which will lay the ground for further research and grant applications. Mentors from the JHU will assist these trainees in assessing their research skills and developing a plan of study to enhance these skills.

**Objective:** The purposes of this four-year project is to establish a breast cancer training program at WSSU that will train individuals to write fundable grant proposals, to conduct successful clinical research projects, to publish and to train other WSSU researchers. A research center will be created where resources such as literature, books, and method file cabinet development and Internet can be used to conduct research. The trainees will also spend time at JHU in a research environment participating in courses and their mentor’s existing research projects. The interdisciplinary committee will provide these trainees with outstanding research environments, and a research community that will place trainees in touch with other leaders in the field, the latest technology and up-to-date information.

**Specific Aim:** The benefit to healthcare lies in the fact that minority women still bear the brunt of breast cancer mortality and morbidity rates. Therefore, the overall research study is “**A Comparative study of Breast Cancer Tumor Markers of underserved elderly minority women and a control group to determine the relationship between tumor activity at the time of initial diagnosis and factors influencing self-detection and self-reporting.**”

**Study Design:** Within this study each trainee will develop a researchable concept in a critical issue relative to detection and diagnosis of breast cancer in elderly minority women. The subjects participating in the pilot studies will be selected from WSSU’s University Community Wellness Center, an academic healthcare center that provides primary care for 3700 residents in public housing. The knowledge and experience gained in the first training program will allow the development of a strong breast cancer program that can be continued into the future of the institution. Also, as trainees graduate, their expertise, as well as the expertise of a collaborating institution, will be used to train further researchers.

**Relevance:** Increasingly women over 50 years of age are diagnosed with breast cancer. Although elderly minority women are less likely to get breast cancer, they are more likely to die from breast cancer than white women. The proposed training program has relevance in that a group of researchers from a Historically Black College or University (HBCU) will receive training in the area of detection. Research developed by these breast cancer researchers will contribute to the knowledge base related to breast cancer morbidity and mortality of elderly black women.

**UNIVERSITY OF MISSOURI-COLUMBIA SUMMER  
UNDERGRADUATE BREAST CANCER RESEARCH  
PROGRAM (SUBCRP)**

**William R. Folk and Linda Blockus**

University of Missouri-Columbia, Columbia, MO 65211

folkw@missouri.edu

The Summer Undergraduate Breast Cancer Research Program (SUBCRP) at the University of Missouri-Columbia (MU) in 2001 supported seven students that participated in faculty-mentored research projects for eight weeks. The SUBCRP students joined 70 others from across the world in the University's Life Sciences Undergraduate Research Opportunities Program, which provided seminars, brown-bag lunches, and specialty discussions on research, clinical trials, career opportunities, preparing for graduate school, communication skills, and ethics. Three of the SUBCRP students were junior biology majors at the University of Missouri-Columbia, and the others were from the University of Missouri-St. Louis, the College of St. Elizabeth (NJ), Southern Illinois University, and Florida A&M University. The students included three African Americans, one Hispanic, and five females. MU faculty from Biochemistry, Biological Sciences, Molecular Microbiology & Immunology, and Nursing served as mentors. Early in the program, faculty mentors for all the students participating in summer research experiences held a forum on "best practices" for mentoring. Research projects included: 1) Sequence elements important for expression of urokinase plasminogen activator (uPA) in cancer cells; 2) An overview of post-breast cancer treatment for lymphedema; 3) Effectiveness of laser perometry for measuring limb volume in lymphedema; 4) Identification of Glc7 and its regulator Glc8 in *Saccharomyces cerevisiae*; Thermostability of murine Polyomavirus J domain mutants using circular dichroism; 6) Regulation of the putative estrogen receptor gamma by 17beta estradiol; 7) Cross-resistance to chemotherapeutic drugs: Does resistance to one drug confer resistance to other drugs?

The students presented the results of their research experiences at the 12<sup>th</sup> undergraduate research science symposium, which included recognition of the efforts of all the undergraduates involved in summer research experiences at the University of Missouri-Columbia. A detailed account of this symposium, the students and faculty involved and their research efforts is available at <http://www.lsurop.missouri.edu/symposium/summer/>. Assessment of the quality of the research experiences was determined from faculty and students.

A similar number of students with comparable backgrounds and interests are planning to participate in the 2002 SUBCRP program.

## **THE MOLECULAR BIOLOGY OF BREAST NEOPLASIA**

**Robin Goldman Leikin, Ph.D., and  
V. Craig Jordan, Ph.D., D.Sc.**

Robert H. Lurie Comprehensive Cancer Center,  
Northwestern University, Chicago, IL 60611

rleikin@northwestern.edu

The Robert H. Lurie Comprehensive Cancer Center has established a premier breast cancer program at Northwestern University, integrating basic laboratory research, clinical research and a program in cancer prevention and control. The Department of Defense funded training program, The Molecular Biology of Breast Neoplasia, enables the Cancer Center to provide state of the art laboratory and didactic training to 4 predoctoral students and two postdoctoral fellows per year. Preceptors are nationally funded faculty with a history of excellence in research with a focus on the cellular and molecular aspects of breast cancer. Predoctoral trainees enroll in the core curriculum of biochemistry, cell biology, molecular biology and biostatistics. In addition, all trainees present once per year at the Breast Cancer Journal Club that brings together the members of the Breast Cancer Program on a weekly basis to discuss journal articles relevant to the molecular biology of breast cancer. In January 2002 we implemented a course in breast cancer biology and treatment, "Advanced Topics in Breast Cancer". The monthly lectures present an integrated overview of clinical breast cancer for laboratory scientists. Trainees are also encouraged to participate in Cancer Center sponsored seminars, symposia and Breast SPORE meetings. The Selection Committee is responsible for selecting applicants and recommending admission to the Program. An Advisory Committee monitors trainee progress. Ultimately, the goal of the Training Program is to prepare scientists to function as independent investigators in the field of breast cancer research and to integrate their research with therapeutic advances made by clinicians.



## **ESTABLISHMENT OF A TRAINING PROGRAM IN BREAST CANCER RESEARCH**

**Susan E. Kane**

Beckman Research Institute, City of Hope National  
Medical Center, Duarte, CA 91010

skane@coh.org

We have established an institutional training program in breast cancer research. The overriding goal of the Breast Cancer Training Program (BCTP) is to provide outstanding training in the basic and clinical science of cancer, with a special emphasis on breast cancer. The overall objective is to develop a new generation of scientists and clinicians trained to do research on breast cancer and its prevention. The program draws on several unique features of our home institution, City of Hope: 1) a strong clinical emphasis on breast cancer; 2) a programmatic commitment to breast cancer research, both basic and clinical; and 3) functioning collaborations between scientists and physicians involved in research. Trainees are drawn from City of Hope's Graduate School in Biological Sciences, a pool of postdoctoral scientists doing research in faculty members' labs, a thriving Surgical Oncology fellowship program, and a new Clinical Cancer Genetics fellowship program. All trainees perform research on topics related to breast cancer; attend a required course in Breast Cancer Biology and Pathology; participate in a Journal Club and Data Exchange Forum with other trainees and their mentors; attend recommended lectures in Biostatistics/Bioinformatics, Breast Cancer Prevention and Treatment, Breast Cancer and Quality of Life, and Genetics of Breast Cancer Risk Assessment; attend seminars and meet with speakers in the field of cancer; attend and present data at national and international conferences on topics related to breast cancer. To date, we have admitted 10 trainees into the BCTP -- 5 graduate students, 4 postdoctoral research fellows, and 1 postdoctoral clinical fellow. All have received stipend support from the DOD training grant. One graduate student has since acquired his own predoctoral fellowship funding; one postdoctoral trainee is now working at a pharmaceutical company in cancer drug development; and the clinical trainee has established herself as a joint fellow in City of Hope's Surgical Oncology, Clinical Cancer Genetics and Breast Cancer training programs. We will describe the grant-funded program and give an update of trainee research and professional accomplishments. Individual trainees will also attend the meeting and present their data.

## **COMPETENCY-BASED TRAINING FOR BREAST CANCER EPIDEMIOLOGY IN MINORITY POPULATIONS**

**Robert S. Levine, M.D.,<sup>1</sup>  
Janet S. Carpenter, Ph.D., R.N.,<sup>2</sup>  
Kangmin Zhu, M.D., Ph.D.,<sup>3</sup>  
and Xiao-ou Shu, M.D., M.P.H., Ph.D.<sup>4</sup>**

<sup>1</sup>Meharry Medical College; <sup>2</sup>Vanderbilt University School  
of Nursing; <sup>3</sup>Pennsylvania State University School of  
Medicine; <sup>4</sup>Vanderbilt-Ingram Comprehensive Cancer  
Center, Vanderbilt University School of Medicine

rlevine@mmc.edu

Recognizing the vital importance of breast cancer research to African Americans, faculty at Meharry Medical College, one of the nation's Historically Black Colleges and Universities (HBCU's), are collaborating with mentors from Vanderbilt University's Schools of Nursing and Medicine to deliver a combined institutional fellowship program.

The program vision is to endow new investigators with an experience that will foster collaboration between those who deliver services, those who define risks, and those who measure health care outcomes. As such, program methodology incorporates interaction between researchers and clinicians. The program curriculum is competency-based. Upon completion, fellows are to be able to: understand epidemiologic and biostatistical principles; apply these principles in designing and conducting high quality etiologic and/or cancer control research studies; manage and analyze epidemiologic data; compose reports about epidemiologic data for communication in scientific meetings and peer reviewed publications; prepare budgets and budget justifications for breast cancer research; understand clinical and cultural environments in which breast cancer research is conducted; and work compatibly in multidisciplinary teams.

To date, four fellows have received training. The program's first graduate was successful in obtaining competitive funding for an etiologic study in breast cancer research, and also collaborated on a new population-based study of breast cancer being conducted at the Vanderbilt-Ingram Comprehensive Cancer Center. The second fellow successfully completed studies on co-morbidity, race, and breast cancer survival. Two fellows are still in training. One is pursuing an investigation about the influence of mental depression on mammography utilization in low-income women, while the other is seeking to identify new methods for assessing population trends in breast cancer disparities.

We conclude that this program is helping to increase the cadre of investigators who have a commitment to finding the new knowledge needed to combat breast cancer and eliminate racial disparities.

**UNDERGRADUATE TRAINING PROGRAM:  
BREAST CANCER UNDERGRADUATE TRAINING  
EXPERIENCE PROGRAM AT UMBC (BCURE)**

**S. Ostrand-Rosenberg**

University of Maryland, Baltimore, MD

srosenbe@umbc.edu

The DOD Undergraduate Training Grant to the University of Maryland Baltimore County (UMBC) supports the UMBC BCURE (Breast Cancer Undergraduate Research Experience) Program. The program admitted its first group of 8 students in May of 2001. These students completed their full-time, hands-on research training working in the laboratories of breast cancer researchers at UMBC and the University of Maryland, Baltimore (Medical School) during the summer of 2001. The participating students were selected from a highly qualified pool of UMBC and Baltimore-area undergraduates. In addition to their laboratory research, students participated in a breast cancer course offered during the summer of 2001. In this course, experts in breast cancer research presented their work and discussed it with the BCURE students. BCURE students also presented their own work orally at biweekly meetings throughout the summer, and in poster format at an end-of-the-summer conference at UMBC. Participating students will also present their work in poster format in May 2002 at UMBC's Breast Cancer Research Day. Approximately half of the BCURE students are currently enrolled in a Biomedical Research Ethics class at UMBC. Several BCURE students have continued their research training in their mentor's laboratory during the current academic year (2001-2002). One of the students has already presented her work at a national conference, and based on her BCURE research project, successfully competed and won a travel award from the American Association of Cancer Research (AACR) to attend the AACR annual conferences in 2002 and 2003. As of the writing of this abstract (May 2002), we are currently recruiting the second year of BCURE students for the summer of 2002.

## **PROJECT LEAD: A SCIENCE TRAINING COURSE FOR BREAST CANCER ADVOCATES**

**Jan Platner, J.D., and Lacie Koppelman, M.S.P.H.**

National Breast Cancer Coalition Fund (NBCCF),  
Washington, DC 20036

[jplatner@natlbcc.org](mailto:jplatner@natlbcc.org)

NBCCF believes that breast cancer advocates should have a seat at the table when decisions are made about breast cancer research and policy. In order to prepare breast cancer advocates to partner with scientists and policy-makers, NBCCF developed Project LEAD, a four-day intensive science-training program. Project LEAD (Leadership, Education, And Development) provides a foundation of scientific knowledge and empowers advocates to contribute to breast cancer research and to educate their communities about breast cancer issues.

Project LEAD students are selected through a competitive application process based on their personal connection to breast cancer, their commitment to breast cancer activism, and their interest and motivation to learning scientific concepts. NBCCF recruited scientists from various disciplines and institutions around the country to help develop and teach the course, which is held four times each year in different U.S. locations. The course curriculum focuses on cancer research and covers the following topics: clinical medicine, basic science, epidemiology, and advocacy development.

The Project LEAD curriculum has developed over 5 years to include lectures, problem-based study groups, case studies, interactive critical appraisal sessions, a seminar by an "expert" scientist, role play, and homework. Participants become familiar with the language and concepts of science, learn to critically appraise scientific literature, learn how breast cancer research decisions are made, and become familiar with a wide range of consumer advocacy opportunities.

Since June 1995, NBCCF has trained over 700 advocates through Project LEAD. Many of these graduates are active on influential boards and committees that relate to breast cancer research and policy. Examples include peer-review panels for federal grant programs, program steering committees at the state or local level, and Institutional Review Boards (IRBs) or data monitoring committees at hospitals or universities.

Through Project LEAD, NBCCF trains breast cancer advocates to make meaningful contributions to legislative, scientific and regulatory decision-making bodies. Course evaluations indicate that Project LEAD graduates gain knowledge, skills, and confidence from the course. This work is supported by Avon Products Foundation Through the Avon Breast Cancer Crusade and also by Bristol-Myers Squibb Oncology and GlaxoWellcome Oncology.

# **RESEARCH PROJECT DESIGN FOR SUMMER TRAINING PROGRAM ON CAD SYSTEM FOR DIGITAL MAMMOGRAPHY**

**Wei Qian, Ph.D., Xuejun Sun, Ph.D., and Robert A. Clark, M.D.**

H. Lee Moffitt Cancer Center and Research Institute at the  
University of South Florida, Tampa, FL 33612-9497

qianw@moffitt.usf.edu

This paper presents a planned training program for undergraduates. It is directed at two main objectives: (a) to train undergraduates master the basic principles and techniques of CAD system for breast cancer detection and (b) to encourage students to contribute themselves to the breast cancer studies in their future careers.

Computer assisted diagnosis (CAD) for breast cancer diagnosis is a complicated technology, which is the combination of mammography, computer technology, digital image processing and artificial intelligence. Through this training program, the trainees will get a basic understanding of mammography and breast cancer study.

During the training program, project design for trainees is an important part for the whole training process. A series of small-scale projects are designed for trainees by mentors that are related to the mentors' current research topics, which are listed as follows:

- (1) Development of image preprocessing modules: It is the first and important stage in image processing. Several methods for this module have been developed with different algorithms, some of which undergraduates have studied. Mentors in this research field are developing new adaptive image preprocessing modules. The trainees will take part in parts of this research project to learn about the development of contemporary CAD preprocessing methods. They will be asked to perform comparison test among current developed methods through computer programming for different image databases. After finishing the work, the trainees are asked to write a report about the performance comparison of the CAD module with different image databases. During training, trainees are encouraged to propose their own methods for this module and to do related computer programming.
- (2) Generation of image databases and truth files: databases of film-screening mammography have been configured and are being expanded, the databases for direct digital mammography have been developed. The trainees will generate databases for different kinds of images under the direction of mentors and research assistants. Under the guidance of radiologists, they will learn to construct the truth files for image databases. The trainees will be required to submit reports about the constructed image database and related truth files.
- (3) Development of Adaptive CAD module for false positive (FP) reduction: Sensitivity and false positive rate are two factors that greatly affect the clinical trial of CAD modules. For a long time, these two performance factors of CAD system were not suitable for the clinical use. Efforts are placed on searching an ideal method that can obtain high sensitivity and keep low false positive rate. In DMIP, a new kind of adaptive CAD system for false positive reduction is being developed. The trainees will assist the mentor to test the performance of developed CAD methods. They will be asked to submit a report on the performance of new module for FP reduction.
- (4) Evaluation of CAD system for breast cancer study: so many CAD systems for mass and MCCs detection have been developed, which need retrospective study and clinical analysis. It is suitable for undergraduates to do this evaluation study. Following the guidance of mentors, the trainees will perform retrospective analysis on current CAD modules using the data sets developed through the Department of Defense Breast Cancer Research Program (BCRP) grant to the University of South Florida (USF) (<http://marathon.csee.usf.edu/Mammography/Database.html>) for film screening mammography or the databases developed by themselves for digital mammography. Being familiar with evaluation method for retrospective study, trainees will be asked to present evaluation reports for different CAD systems.

## THE AMELIA PROJECT RETREAT. GIVING WINGS TO RESEARCH

**Connie Rufenbarger and Brian Shappell**

The Catherine Peachey Fund, Inc., Warsaw, IN 46581

[connierufe@peacheyfund.org](mailto:connierufe@peacheyfund.org)

The Catherine Peachey Fund (CPF), established in 1996, is a non-profit, grassroots organization of over 100 survivors and their supporters. The Fund has raised 1.5 million dollars for breast cancer research in Indiana. The Amelia Project Retreat. Giving Wings to Research (Retreat) was created by consumers in order to impact and expedite the research agenda in Indiana.

**The Retreat** is designed to improve the quality of care for Indiana women by fostering a statewide community of scientists and clinicians who in partnership with the consumers are working toward the eradication of breast cancer.

**The Retreat** brings senior and junior scientists, clinical investigators and students from six different Indiana universities and colleges together on a neutral field under the consumer umbrella in order to foster cross institutional and cross disciplinary boundaries to advance research. The Retreat incorporates an agenda of scientific presentations and a newly added poster session. The meals and breaks are designed to maximize the opportunity for the attendees to meet and collaborate. Attendees are listed on an interactive web site by areas of interest in order to allow them to communicate between meetings. The Indianapolis Affiliate of the Susan G. Komen Breast Cancer Foundation underwrites the Retreat costs. Volunteers and the CPF Trustees facilitate and host the Retreat.

**The Retreat**, now in its fifth year, began with 30 scientists and consumers and has grown to over 100 attendees participating in the 2002 Retreat. The success of the poster session will result in it being a permanent part of each ensuing years' programs. The plan for the year 2003 is to facilitate field trips for investigators among invited institutions. Post Retreat evaluation comments reflect how the Retreat has been successful in launching innovative research projects as well as helping to create close working relationships among the scientists.

**George Sledge, M.D.**, Ballve-Lantero Professor of Medicine, IU Cancer Center said, "I went into work on Monday and found my troops all pumped up. Dr. Kathy Miller and Mike Kinch basically sketched out a DOD grant on Saturday, Hari Nakshatri found a new collaborator and Chris Sweeney got several new research ideas."

**Kenneth P. Nephew, Ph.D.**, Cellular and Integrative Physiology, IU School of Medicine, said, "The Amelia Project is a powerful way to reinforce the significance of why we are doing what we are doing, and I always feel inspired after attending the conference."

**David Riese, Ph.D.**, Purdue School of Pharmacy and Pharmalical Sciences said, "because of this meeting, investigators in the Indiana breast cancer research community are interacting in novel ways and working on novel projects that may ultimately lead to new therapeutics or diagnostics."

**The Retreat**, a project of the CPF, is an effective consumer driven vehicle for enhancing research though fostering scientific collaborations.

## **CREATING A SUMMER BREAST CANCER RESEARCH PROGRAM FOR UNDERGRADUATES**

**Gayle R. Slaughter, Ph.D., and Suzanne Fuqua, Ph.D.**

Baylor College of Medicine, Houston, TX 77030

gayles@bcm.tmc.edu

A ten-week summer research experience for undergraduates that focused primarily on signal transduction aspects of breast cancer research was developed. Eight women college students (two under-represented minority students) from across the country participated in research projects, discussions of breast cancer research and attended other activities with 90 participants in the SMART Program at Baylor College of Medicine. The central component of the project was mentored research related to understanding, treating and preventing breast cancer. Six of the eight students actually achieved positive results during a 10 week period despite disruptions to research by Tropical Storm Allison. Several projects explored the role of estrogen and progesterone receptors or co-repressors or other transcription factors that influence expression of genes involved in breast cancer. Students identified co-repressors and factors that bound to the estrogen receptor (ER) and mechanisms by which ER affected gene transcription directly and through AP-1. One student studied phosphorylation sites in the human progesterone receptor B. One student identified potential histone variants that may influence regulation of chromatin structure and gene expression in tumor cells. One student successfully isolated clones of a construct to express p190, a rho-GAP that enhances GTPase activity. The effect of this protein on the cytoskeleton will be tested to establish its role in tumor cell invasiveness. This student has been awarded a 2002 Endocrine Society Summer Research Fellowship to return to the lab to continue her studies. Students presented their results at the end of the program to their group and other interested SMART Program participants.

Weekly workshops presented a variety of research approaches by Ph.D. students (including two under-represented minorities) and faculty (one under-represented minority). Five noon-time seminars on cancer, including one on breast cancer, were presented for SMART Program participants in the “Fundamentals and Frontiers of Biomedical Sciences” seminar series. A breast cancer survivor shared her stories of living with and educating researchers and care-providers about patients’ perspectives.

## **PREDOCTORAL TRAINING PROGRAM IN BREAST CANCER RESEARCH**

**David F. Stern, Ph.D.**

Department of Pathology, Yale University School of Medicine,  
PO Box 208023, New Haven, CT 06520-8023

df.stern@yale.edu

Breast cancer is one of the leading causes of cancer deaths of women in the United States. Fortunately, this disease is no longer a “black box” that can only be studied empirically. Recent advances in understanding of normal mammary development and carcinogenic processes have identified a number of specific genes and processes that are dysregulated in breast cancer. This means that research on breast cancer has advanced to the stage where a concentrated effort in translational research will yield great strides in detection, diagnosis, and treatment. The Predoctoral Training Program in Breast Cancer Research was created to recruit individuals interested in careers in breast cancer research through the Molecular Medicine Track of the combined Ph.D. training program at Yale, to provide specialist training in breast cancer-specific areas, and integrate the training experience with basic scientists and clinicians investigating breast cancer.

Accomplishments of the Program include: recruitment of a highly qualified group of students interested in cancer research; guidance of students through an appropriate series of classes, including training in cell biology, disease mechanisms, cancer, and pharmacology; creation of a new course, “Biology and Therapy of Breast Cancer” for trainees and other members of the Yale community; providing students with research rotations relevant to cancer research; selection of second year students with dissertation projects relevant to breast cancer research for further training through the program.

Thus far, the Program has directly funded training of seven graduate students, most of whom continue to work in areas directly relevant to breast cancer research. Moreover, the Breast Cancer course and related activities have enhanced understanding and awareness of breast cancer throughout the university community.